

FRAMATOME ANP

Method and device for producing electricity from the
heat produced in the core of at least one
high temperature nuclear reactor

Abstract

A first coolant gas in contact with the core (5) of the high temperature nuclear reactor (1) is circulated in a closed circuit, a second heat-exchange gas is heated by heat-exchange with the first exchange gas or coolant gas and the second heat-exchange gas heated by the first coolant gas is used in an intermediate exchanger (7) to drive at least one gas turbine (2) coupled to an electric generator (4). The first exchange gas consists mainly of helium and the second exchange gas contains substantially 50 to 70% by volume of helium and 50 to 30% by volume of nitrogen. The second heat-exchange gas is circulated in a closed circuit so that the second heat-exchange gas at least drives the at least one gas turbine (2). Preferably, the device also comprises a tertiary circuit (10) in which there circulates water and steam formed by heating water from a fraction of the second exchange fluid and used to drive steam turbines (3a, 3b, 3c) preferably mounted on the shaft of the electric generator (4).

Fig. 1

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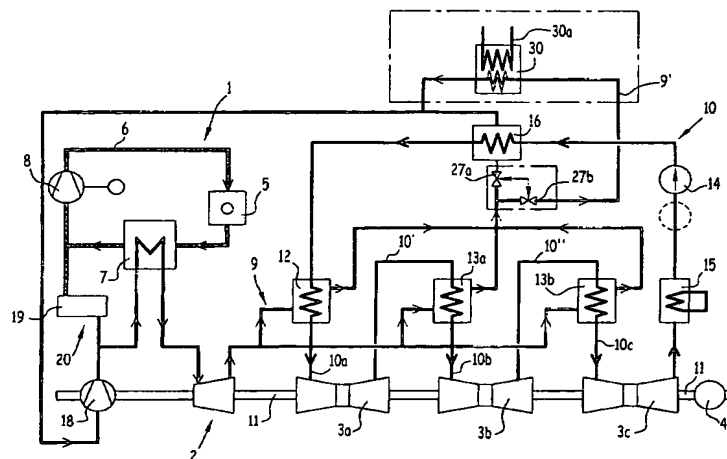
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LE COEUR D'AU MOINS UN REACTEUR NUCLEAIRE A HAUTE TEMPERATURE



(57) Abstract: A first heat-transfer gas is circulated in contact with the core (5) of the high-temperature nuclear reactor (1) in a closed circuit. A second thermal exchange gas is heated by exchange of heat with the first exchange gas or heat-transfer gas and the second thermal exchange gas, heated by the first heat-transfer gas in an intermediate exchanger (7) is used to drive at least one gas turbine coupled to an electrical generator (4). The first exchange gas principally comprises helium and the second exchange gas is substantially 50 % to 70 % helium and 50 % to 30 % nitrogen by volume. The second thermal exchange gas is circulated in a closed circuit such that the second thermal exchange gas guarantees the drive for at least one gas turbine (2). The device also preferably comprises a third circuit (10) in which circulate water and the steam formed by heating the water with a part of the second exchange fluid and used to drive steam turbines (3a, 3b, 3c) preferably arranged on the shaft of the electrical generator (4).

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